

What is claimed is:

1. A semiconductor chip mounting apparatus comprising:

5 a semiconductor chip supply unit to supply a semiconductor chip;

a mounting member carrier unit to carry a mounting member;

a semiconductor chip carrier unit to carry out  
10 mounting operations, wherein said mounting operations include picking up said semiconductor chip from said semiconductor chip supply unit, carrying said semiconductor chip to a mounting position of said mounting member, and mounting said semiconductor chip on said mounting position  
15 of said semiconductor chip carrier unit;

a sensor unit to measure first and second positions of said semiconductor chip carrier unit before and during said mounting operations, respectively;

a control unit to calculate position deviations of said  
20 first position of said semiconductor chip carrier unit from said second position of said semiconductor chip carrier unit to provide position adjustment instructions when said position deviations are greater than a predetermined value; and

means configured to adjust said second position of  
25 said semiconductor chip carrier unit in response to said position adjustment instructions of said control unit.

2. A semiconductor chip mounting apparatus comprising:

5 a semiconductor chip supply unit to supply a semiconductor chip;

a lead frame carrier unit to carry a lead frame;

a semiconductor chip carrier unit to carry out semiconductor chip mounting operations, wherein said semiconductor chip mounting operations include picking up  
10 said semiconductor chip from said semiconductor chip supply unit, carrying said semiconductor chip to a mounting position of said lead frame, and mounting said semiconductor chip on said mounting position;

a sensor unit to measure first and second positions  
15 of said semiconductor chip carrier unit before and during said mounting operations, respectively;

a control unit to calculate position deviations of said first position of said semiconductor chip carrier unit from said second position of said semiconductor chip carrier unit to  
20 provide position adjustment instructions where said position deviations are greater than a predetermined value; and

means configured to adjust said second position of said semiconductor chip carrier unit in response to said position adjustment instructions of said control unit.

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3. A semiconductor chip mounting apparatus

according to Claim 2, wherein said sensor unit measures said second position of said semiconductor chip carrier unit when said semiconductor chip carrier unit carries out semiconductor chip mounting operations at predetermined  
5 times.

4. A semiconductor chip mounting apparatus according to Claim 3, wherein said predetermined times are increased if said position deviations are less than said  
10 predetermined value, or decreased if said position deviations are greater than said predetermined value.

5. A method of mounting a semiconductor chip, comprising:  
15 measuring a first picking-up position of a semiconductor chip carrier unit by a sensor unit before mounting operations;  
storing data of said first picking-up position measured by said sensor unit in a control unit;  
20 moving said semiconductor chip carrier unit to a second picking-up position;  
picking-up said semiconductor chip from a semiconductor chip supply unit at said second picking-up position by said semiconductor chip carrier unit;  
25 carrying said semiconductor chip picked up by said semiconductor chip carrier unit to, and mounting the same on,

a mounting position of a lead frame forwarded by a lead frame carrier unit;

measuring said second picking-up position by said sensor unit during the mounting operations;

5 storing data of said second picking-up position measured by said sensor unit in said control unit;

comparing said data of said first picking-up position with those of said second picking-up position to calculate position deviations; and

10 adjusting said second picking-up position of said semiconductor chip carrier unit in response to instructions of said control unit in case that said position deviations are greater than a predetermined value.

15 6. A method of mounting a semiconductor chip in accordance with Claim 5, wherein said measuring of said second picking-up position of said semiconductor chip carrier unit is made when said mounting operations are carried out at predetermined times.

20 7. A semiconductor chip mounting apparatus according to Claim 6, wherein said predetermined times are increased if said position deviations are less than said predetermined value, or decreased if said position deviations  
25 are greater than said predetermined value.

8. A semiconductor chip mounting apparatus comprising:

a semiconductor chip supply unit to supply a semiconductor chip;

5 a lead frame carrier unit to carry a lead frame;

a semiconductor chip carrier unit to pick up said semiconductor chip from said semiconductor chip supply unit, to carry said semiconductor chip to a mounting position of said lead frame, and to mount said semiconductor chip on said  
10 mounting position;

a sensor unit to measure data of said picking-up position of said semiconductor chip carrier unit and data of said mounting position of said lead frame carrier unit;

a control unit to provide position adjustment  
15 instructions, wherein said control unit calculates picking-up position deviations of said data of said picking-up position measured by said sensor unit before semiconductor chip mounting operations from those during said semiconductor chip mounting operations and said position adjustment  
20 instructions are provided when said picking-up position deviations are greater than a predetermined value, and wherein said control unit calculates mounting position deviations of said data of said mounting position measured by said sensor unit before semiconductor chip mounting  
25 operations from those measured by said sensor unit during said semiconductor chip mounting operations and said

position adjustment instructions are also provided when said mounting position deviations are greater than a predetermined value; and

means configured to adjust said picking-up and  
5 mounting positions of said semiconductor chip carrier unit in response to said position adjustment instructions from said control unit.

9. A semiconductor chip mounting apparatus  
10 according to Claim 8, wherein said sensor unit measures said picking-up position of said semiconductor chip carrier unit and said mounting position of said lead frame carrier unit when said semiconductor chip mounting operations are carried out at predetermined times.

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10. A method of semiconductor chip mounting apparatus, comprising:

measuring a first picking-up position of a semiconductor chip carrier unit and a first mounting position  
20 of a lead frame carrier unit by a sensor unit before mounting operations;

storing data of said first picking-up and first mounting positions in a control unit;

moving said semiconductor chip carrier unit to a  
25 picking-up position to pick up a semiconductor chip from a semiconductor chip supply unit;

carrying said semiconductor chip picked up by semiconductor chip carrier unit to a mounting position of a lead frame in said lead frame carrier unit;

mounting said semiconductor chip on said mounting  
5 position of said lead frame;

measuring a second picking-up position of said semiconductor chip carrier unit during said mounting operations;

storing data of said second picking-up position in  
10 said control unit;

comparing said data of said first picking-up position with said data of said second picking-up position;

calculating picking-up position deviations of said first picking-up position from said second picking-up position;

15 providing picking-up position adjustment instructions from said control unit when said picking-up position deviations are greater than a predetermined value;

measuring a second mounting position of said lead frame carrier unit during said mounting operations;

20 storing data of said second mounting position in said control unit;

comparing said data of said first mounting position with said data of said second mounting position;

calculating mounting position deviations of said  
25 first mounting position from said second mounting position;

adjusting said second picking-up position of said

semiconductor chip carrier unit where said mounting position deviations are within said predetermined value and said picking-up position deviations are greater than said predetermined value; and

5            adjusting said second mounting position of said lead frame carrier unit in response to position adjustment instructions from said control unit by an amount equal to adding said picking-up position deviations to said mounting position deviations where both said mounting position  
10 deviations and said picking-up position deviations are greater than said predetermined values, respectively.

11. A method of mounting semiconductor chips according to Claim 10, wherein said measuring of said second  
15 picking-up position of said semiconductor chip carrier unit and said second mounting position of said lead frame carrier unit take place when said mounting operations are carried out at predetermined times.

20            12. A semiconductor chip mounting apparatus comprising:

          a semiconductor chip supply unit to supply a semiconductor chip;

          a lead frame carrier unit to carry a lead frame;

25            a semiconductor chip carrier unit to pick up said semiconductor chip from said semiconductor chip supply unit,



to carry said semiconductor chip to a mounting position of said lead frame, and to mount said semiconductor chip on said mounting position;

5 a sensor unit to measure data of a first position of said semiconductor chip carrier unit before mounting operations and those of a second position of said semiconductor chip carrier unit during said mounting operations;

10 a control unit to provide position adjustment instructions, wherein said control unit calculates position deviations of said first position of said semiconductor chip carrier unit from said second position of said semiconductor chip carrier unit and said position adjustment instructions are directed to either a position of said semiconductor chip supply unit or that of said semiconductor chip carrier unit  
15 when said position deviations are greater than a predetermined value; and

means configured to return said semiconductor chip supply unit to a first semiconductor supply position or said  
20 semiconductor chip carrier unit to said first picking-up position in response to said position adjustment instructions from said control unit.